

EXPRESS MAIL LABEL NO. EV381146236US

WHAT IS CLAIMED IS:

1. A circuit for controlling a minimum operating voltage of an integrated control circuit of a switching power supply having a supply voltage, said circuit comprising:

at least one switch for switching the minimum operating voltage from a first voltage value to a second voltage value under conditions of low or null load of the switching power supply, and for switching the minimum operating voltage from the second voltage value to the first voltage value if the load of the switching power supply is greater than a predetermined load and the supply voltage is greater than the first voltage value,

wherein the minimum operating voltage can assume at least the first voltage value and the second voltage value, and

the first voltage value is greater than the second voltage value.

2. The circuit according to claim 1, wherein the at least one switch switches the minimum operating voltage from the first voltage value to the second voltage value when a voltage proportional to the load of the switching power supply is less than a first reference voltage.

3. The circuit according to claim 1, wherein the at least one switch switches the minimum operating voltage from the second voltage value to the first voltage value when a voltage proportional to the load of the switching power supply is greater than a first reference voltage and the supply voltage is greater than the first voltage value.

4. The circuit according to claim 1,
wherein the minimum operating voltage can also assume a third voltage value,
the third voltage value is greater than the first voltage value, and
the at least one switch switches the minimum operating voltage from the first voltage value to the third voltage value when a voltage proportional to the load of the switching power supply is greater than a second reference voltage.

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5. The circuit according to claim 4, wherein the at least one switch switches the minimum operating voltage from the first voltage value to the third voltage value when a voltage proportional to the load of the switching power supply is greater than the second reference voltage and the switching power supply is already operating.

6. The circuit according to claim 4, further comprising:
a circuit that supplies a second supply voltage to a driving circuit of the switching power supply when the supply voltage overcomes the first voltage value, wherein the at least one switch switches the minimum operating voltage from the first voltage value to the third voltage value when a voltage proportional to the load of the switching power supply is greater than the second reference voltage and a predetermined delay has passed since the second supply voltage was supplied to the driving circuit.

7. An integrated circuit comprising the circuit according to claim 1.

8. A switching power supply comprising the integrated control circuit according to claim 7.

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9. A circuit for controlling a minimum operating voltage of an integrated control circuit of a switching power supply having a supply voltage, said circuit comprising:
a first comparator for comparing a control voltage and a first reference voltage;
a second comparator for comparing the supply voltage and a first voltage value; and

a selection circuit coupled to the first and second comparators, the selection circuit switching the minimum operating voltage from the first voltage value to a second voltage value when the first comparator indicates that the control voltage is less than the first reference voltage, and switching the minimum operating voltage from the second voltage value to the first voltage value when the first comparator indicates that the control voltage is greater than the first reference voltage and the second comparator indicates that the supply voltage is greater than the first voltage value,

wherein the first voltage value is greater than the second voltage value.

10. The circuit according to claim 9, wherein the control voltage is the control voltage of the switching power supply.

11. The circuit according to claim 9, wherein the control voltage is a voltage proportional to the load of the switching power supply.

12. The circuit according to claim 9,

wherein the selection circuit switches the minimum operating voltage from the first voltage value to a third voltage value when the control voltage is greater than a second reference voltage, and

the third voltage value is greater than the first voltage value.

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13. The circuit according to claim 9,
wherein the selection circuit switches the minimum operating voltage from the first voltage value to a third voltage value when the control voltage is greater than a second reference voltage and the switching power supply is already operating, and
the third voltage value is greater than the first voltage value.
14. The circuit according to claim 9, further comprising:
a circuit that supplies a second supply voltage to a driving circuit of the switching power supply when the supply voltage overcomes the first voltage value,
wherein the selection circuit switches the minimum operating voltage from the first voltage value to a third voltage value when the control voltage is greater than a second reference voltage and a predetermined delay has passed since the second supply voltage was supplied to the driving circuit, and
the third voltage value is greater than the first voltage value.
15. An integrated circuit comprising the circuit according to claim 9.
16. A switching power supply comprising the integrated control circuit according to claim 15.

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17. A method for controlling a minimum operating voltage of an integrated control circuit of a switching power supply having a supply voltage, said method comprising the steps of:

switching the minimum operating voltage from a first voltage value to a second voltage value under conditions of low or null load of the switching power supply; and

switching the minimum operating voltage from the second voltage value to the first voltage value if the load of the switching power supply is greater than a predetermined load and the supply voltage is greater than the first voltage value, wherein the first voltage value is greater than the second voltage value.

18. The method according to claim 17, wherein a condition of low or null load of the switching power supply is determined when a voltage proportional to the load of the switching power supply is less than a first reference voltage.

19. The method according to claim 17, wherein it is determined that the load of the switching power supply is greater than a predetermined load when a voltage proportional to the load of the switching power supply is greater than a first reference voltage.

20. The method according to claim 17, further comprising the step of:

switching the minimum operating voltage from the first voltage value to a third voltage value when a voltage proportional to the load of the switching power supply is greater than a second reference voltage, the third voltage value being greater than the first voltage value.